HIGH SCHOOL AND UNIVERSITY MATRICULATION EXAMINATIONS BOARD.

DEPARTMENTAL EXAMINATIONS

SEPTEMBER, 1931

ALGEBRA 2.

Time—Three hours.

Values.

8 **1.** Find the H.C.F. and L.C.M. of

$3x^3 - 3ax^2 + 2a^2x - 2a^3$ and

$3x^3 + 12ax^2 + 2a^2x + 8a^3$.

8 **2.** *Either* Simplify:

$$\frac{1}{a-b} - \frac{1}{2(a+b)} - \frac{a+3b}{2(a^2+b^2)} - \frac{4b^3}{a^4-b^4}$$

Or Solve and verify:

$$\frac{8x+5}{10} - \frac{9x-3}{7x+2} = \frac{4x-3}{5}$$

3. When the track of a railway is curved, the outer rail is raised h inches above the inner rail, according to the formula

$$h = \frac{12dV^2}{5R.}$$

Where $d =$ distance between the rails in feet

$R =$ radius of curve in yards

$V =$ maximum speed in miles per hour.

2 (1) Solve for V in terms of the other letters.

5 (2) Find V if $d = 4\frac{1}{2}$ feet, $h = 2.4$ inches, $R = 1800$ yards.

8 **4.** Find the value to three decimal places of

$$\frac{x+y}{x-y} + \frac{x-y}{x+y} \qquad \text{when } x = 2 + \sqrt{3}, \quad y = 2 - \sqrt{3}$$

[OVER]

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URR HIST

Values.

8 **5.** (*a*) Use the method of completing the square to solve the following equation, giving the roots correct to 2 places of decimals.

$$5x^2 - 8x + 2 = 0.$$

$$(\sqrt{6} = 2.449)$$

7 (*b*) Solve, using the formula:

$$2x^2 + x = 6.$$

7 (*c*) Solve, by factoring:

$$x^2 + 2x(a + b) + 4ab = 0.$$

8 **6.** Solve and verify:

$$\frac{1}{x} + \frac{2}{y} = 8$$

$$\frac{1}{x^2} + \frac{4}{y^2} = 40$$

8 **7.** Solve and verify:

$$x^2 - xy = 54$$

$$xy - y^2 = 18.$$

6 **8.** (*a*) Divide $x^{\frac{4}{3}} + x^{\frac{2}{3}}y^{\frac{2}{3}} + y^{\frac{4}{3}}$ by $x^{\frac{2}{3}} + x^{\frac{1}{3}}y^{\frac{1}{3}} + y^{\frac{2}{3}}$.

6 (*b*) Simplify: $\dfrac{2^{n+1}}{\left(2^{n}\right)^{n-1}} \times \dfrac{\left(2^{n-1}\right)^{n+1}}{4^{n+1}}$

7 **9.** Find the square root and verify:

$$101 - 28\sqrt{13}.$$

12 **10.** *Either* OX and OY are two roads at rights angles. A starts at noon from O along OX at 3 miles per hour. B starts at 2 o'clock from O along OY at 4 miles per hour. Find to the nearest minute when they will be 20 miles apart.

Or A man rows down stream 12 miles in 4 hours less than it takes him to return. Should he row at twice his usual rate, his rate down stream would be 10 miles an hour. Find his rate in still water, and the rate of the stream.

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